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What Educators Should Know about Teaching Digital Storytelling

Bernard R. Robin

brobin@uh.edu

University of Houston, Houston, Texas, USA

Sara G. McNeil

smcneil@uh.edu

University of Houston, Houston, Texas, USA

Abstract

In this paper, the authors present some of the most important lessons they have learned from teaching courses, conducting workshops, writing articles, and supervising graduate student research on the educational uses of digital storytelling. The guidelines described here are categorized within the ADDIE instructional design framework and are presented as starting points that educators should consider when they begin to integrate digital storytelling in their classrooms. The guidelines provide useful information that will help educators teach students all phases of the digital storytelling process, including analysis, design, development, implementation and evaluation of digital storytelling projects that focus on educationally meaningful topics.

Keywords: Digital Storytelling; Instructional Design; ADDIE Framework; Educational Technology; Multimedia

I. Introduction

For the past several years, digital storytelling has been a major focus in the University of Houston's College of Education. Faculty members and graduate students in the Laboratory for Innovative Technology in Education (LITE) teach courses, deliver workshops, conduct research, write articles and share presentations at conferences on the many different aspects of how digital storytelling can be used in educational settings (e.g., Dogan & Robin, 2008; Robin, 2008a; Robin, 2008b; Robin & Pierson, 2005; Robin, White & Abrahamson, 2009; Rudnicki, et. al, 2006). This work has included K-12 teachers and their students, undergraduate and graduate students at the university, and college faculty members from different content areas. We also maintain a comprehensive website (Educational Uses of Digital Storytelling http://digitalstorytelling.coe.uh.edu/) that reaches educators and students across the globe, as evidenced by a 2010 survey we conducted on the uses of digital storytelling around the world (Yuksel, Robin, & McNeil, 2011).

In addition, our doctoral students have conducted research and published articles and dissertations that have added to the body of knowledge and our conceptual understanding of how this technology tool can be used to enhance both the teaching and learning experience. Working so intensely on the many facets of digital storytelling has helped us achieve a great deal of practical expertise in how students can be successful at creating educationally meaningful digital stories to support their learning. In this article, we share some of the most important lessons we have learned about digital storytelling that we hope will benefit other educators who may wish to use this technology tool in their own teaching.

a. What has our research on digital storytelling shown?

Even though digital storytelling has been practiced for more than two decades, a limited amount of research has been conducted on this technology, especially as it has been used in educational settings. One of the first doctoral dissertation research studies at the University of Houston on digital storytelling was conducted by Bulent Dogan in 2007 (Dogan, 2007). In this study, three groups of public school teachers were tracked following their participation in an intensive digital storytelling workshop offered at the university. The three groups, composed of elementary, middle, and high school teachers, learned to create digital stories that they could use in their own classrooms. The teachers completed pre- and three-month-post-workshop surveys that were used to measure and evaluate whether or not they continued to use digital storytelling in their teaching, the impact of such use and, in cases where there was no use, the barriers that prevented this use. The teachers who used digital storytelling in their classrooms believed that their students increased their technical, research, presentation, organizational and writing skills. Teachers also reported that they thought that the digital storytelling process had positive effects on students' motivation and engagement levels.

In 2009, Anne Rudnicki completed a doctoral dissertation (Rudnicki, 2009) focused on the dialogical aspects of the digital story development process used by graduate students in a digital storytelling course and a popular culture course that were taught as a linked pair at the University of Houston. In her research, Rudnicki explored whether discussions about storytelling evoked students' higher consciousness of the stories they tell and in turn helped them tell more meaningful digital stories. Some of the topics that emerged from the research included personal narrative versus academic writing, story circles as knowledge communities, aesthetic knowing, digital stories as narratives of inquiry, and teachers as curriculum makers. One of the most practical outcomes of this study was the development of a "Story Circle Guide," which is still being used in our digital storytelling courses and workshops.

In her 2011 doctoral research study on digital storytelling, Anh Nguyen interviewed graduate students at the University of Houston about the challenges they faced when they created a comprehensive digital storytelling project on an educationally relevant topic for a course in which they were enrolled. Nguyen focused her investigation on understanding the experience of these digital storytellers and the choices they made in creating their stories. She found that students' own learning and teaching practices were influenced by personalizing elements in the script, using computer-based digital storytelling software, reflecting on their own work and listening to feedback from others, and perhaps most important, sensing their own progress as they worked through all

of the components of the digital storytelling process. These findings provide useful implications for instruction and evaluation in teaching digital storytelling and suggest many opportunities for future research. Nguyen's study focused on graduate students' use of digital storytelling; similar research that explored digital storytelling use by college and/or high school students would also be valuable areas for research studies conducted by our current doctoral students. In addition, we are interested in research that more closely examines characteristics of technological skills and literacies in order to gain further insight into how individual learners can best take advantage of digital storytelling in educational settings.

Based on the results of these doctoral research studies, as well as lessons we have learned from teaching courses, conducting workshops and writing articles on the educational uses of digital storytelling, we have developed a set of guidelines that we feel educators should consider when they begin to integrate digital storytelling in their own classrooms and teach students to create digital stories on instructionally meaningful topics. We have structured these guidelines within the framework of the ADDIE model of instructional design.

b. The ADDIE Model

ADDIE, an acronym that stands for Analysis, Design, Develop, Implement and Evaluate, is a five-step process of instructional design that has been widely used in both education and industry since it was developed in the mid-1970s (Clark, 2011; Molenda, 2003). Morrison, Ross, and Kemp (2007) noted that ADDIE is not an original design model, but "a label that refers to a family of models that share common basic elements." (p. 13). Each stage of the model provides a framework for collecting information necessary to complete related tasks (Cennamo & Kalk, 2005). Most systematic instructional design models use similar elements with variations in emphasis, depth, time, and representation (Gagne, Wager, Golas, & Keller, 2005).

Figure 1: The ADDIE Model

II. Analysis

In the analysis phase, the designer of the instruction identifies an instructional goal and analyzes the learners, the learning context, and the tasks that should be performed. The guidelines related to this ADDIE phase include analyzing aspects of the digital story related to the topic and script, as well as analyzing the potential audience for the story.

Guideline 1: *Distinguish the characteristics of an educational digital story*

With so many different types of media files available online, including digital photo essays, slideshows set to music, instructional videos, and an ever increasing number of animated projects created with Web 2.0 tools, we have found that many students are not able to clearly differentiate between what is and what is not a digital story. Almost all of the accepted descriptions of digital storytelling define this technology as a way to combine different types of multimedia, including still images, text, video clips, audio narration and music to tell a short story, usually just a few minutes in length, on a particular topic or theme. Most educational digital stories are classified within a general list of categories that include personal accounts that tell stories about significant events, people and places in our lives; stories that examine or retell historical events; and stories that inform and instruct, often with some overlap between categories.

A comprehensive overview of the defining elements that make a digital story suitable in the classroom can be a useful topic for educators to discuss with their students, especially when working with students who are new to this type of technology. This discussion should include watching example digital stories together and exploring various questions that may arise from the viewing, including:

1. What is the topic of the story?
2. What is the main purpose of the story?
3. Who created it?
4. Were educators and/or students involved in the creation of the story?
5. Who is the intended audience?
6. Is the information presented in a clearly organized and logical manner?
7. Does the story contain narration that is easy to hear and understand?
8. If music and video clips are included, do they significantly improve the story?
9. What educational value, if any, does the digital story contain?
10. Are there distinct ways that the story could be improved?

These are just some of the items that educators and their students might consider when they embark on using digital storytelling in the classroom. These items may be used as a starting point to begin the digital storytelling process, and other questions should be added to this list as needed.

Guideline 2: *Analyze the audience and develop the digital story script accordingly*

In order to tell a story that will interest others, digital story creators should identify the audience as clearly and specifically as possible. As the script for the story is written, students should keep in mind who they are trying to reach. Creators should consider the age, gender, cultural background and other defining characteristics of the intended audience to make sure that the story is appropriate for those viewers. They should also think about what they want viewers to know from watching their story and what are some ways to get and keep the attention of these particular viewers. One strategy that we have found to be effective is to begin a digital story with by asking an opening question or presenting a compelling introduction to gain the attention of the audience.

Our students are encouraged to consider the language they use in their stories to make sure that it will be understandable by viewers who may represent different age groups and come from different cultural backgrounds. We also stress that digital stories should focus on common themes that most viewers can identify with, such as personal reflection, historical narrative or the presentation of instructional content.

Guideline 3: *Choose an interesting topic and add a personal connection*

A major challenge for a digital story creator is how to write a script on a topic that will present information in a way that interests viewers unfamiliar with the topic. For example, if a student is writing a script about how computers have become an important part of everyday life, he or she might start by going to the Wikipedia website to get some background information about personal computers that they could use as the beginning of their story. Here is what they would find:

"A personal computer (PC) is any general-purpose computer whose size, capabilities, and original sales price make it useful for individuals, and which is intended to be operated directly by an end-user with no intervening computer operator. In contrast, the batch processing or time-sharing models allowed large expensive mainframe systems to be used by many people, usually at the same time. Large data processing systems require a full-time staff to operate efficiently." (http://en.wikipedia.org/wiki/Personal_computer)

However, that text is mechanical and dispassionate and would certainly not fit most teachers' description of an engaging script for a digital story. Instead, a student might try writing something more personal, such as this:

"When I wake up every morning, one of the first things I do is turn on my computer. I never have given this much thought, but recently I began wondering about what people at other times in history did when they first woke up each day. For many throughout history, there was no electricity, which meant there were no refrigerators. So, finding food to eat when you first woke up was probably a lot more challenging and necessary than turning on a computer."

Students should be encouraged to select a topic that they feel passionate about, write a script that reflects that passion, and make the story as interesting as possible for their specific audience.

Digital story creators should add a personal viewpoint to the script so that it sounds more like a story they are telling from their own experience and less like passages from a textbook, a journal article, or a website. Digital stories that focus on significant life events, honor the memory of friends and loved ones, or recount the process of accomplishment, challenge and recovery gain an extra measure of emotional power and meaning that is felt by both the digital story creator and the viewer. A first person account may be used to highlight recollections from the past, provide an understanding about present day events and look forward to hope and aspirations that may occur in the future. In all of these cases, the personal connection to the story is what makes it compelling since they often revolve around universal themes and questions that we all share.

III. Design

In the design phase, designers of instruction make decisions about how information should be presented depending on the analysis performed in the first stage (Lohr, 2003). In this ADDIE phase, digital story creators complete the script and storyboard for the design of the story as well as collect and organize appropriate media such as images, audio and video.

Guideline 4: *Recognize the importance of a detailed script*

The script for an educational digital story is one of the most important components that students will create. We stress to our students and workshop participants that a good digital story must first be a good story and that no matter how much expertise a student has with technology, a poorly written story will not be improved by fancy transitions and other digital effects.

Scriptwriting can be difficult for many students and is certainly more taxing and less fun than some

of the other tasks associated with creating a digital story, like searching for images or adding music. However, digital storytellers at all levels must understand that a well thought out, well written script is an absolute requirement for a good digital story and we require our students to write a draft version of the script for their story before they begin work on creating the digital story. The script should stand on its own merits, even if there are no visuals, narration, music, animations, or other components that will eventually add interest to the digital version.

Guideline 5: ***Create a detailed storyboard before work on the actual creation begins***

Creating storyboards is an often overlooked part of the digital storytelling process, and for many students, storyboarding may seem like a tedious extra step in the development. However, storyboarding can be a valuable component in the creative process by allowing the student to organize images and text in a blueprint fashion before the actual creation begins. It allows the student to visualize how the project will be put together and helps illustrate what portions of the story need more work because they can see the entire plan laid out in front of them. Storyboarding can also inspire new ideas as well as let the student rearrange existing resources before the final development begins, when changes may be harder to make. Storyboards provide a way to decide how the digital story script can be split up into individual pieces, either with or without placeholder images, so that the student can then get a clearer overview of their digital story plan. Storyboards may be created on a computer using programs such as Microsoft Word, Excel or PowerPoint, as well as specialized software such Celtx media pre-production software, available from: http://celtx.com/download.html

Storyboards may also be sketched by hand, allowing students who do not have access to a computer to complete this phase of development. The most important thing to remember is that creating a storyboard is an integral part of the pre-development process that should not be skipped.

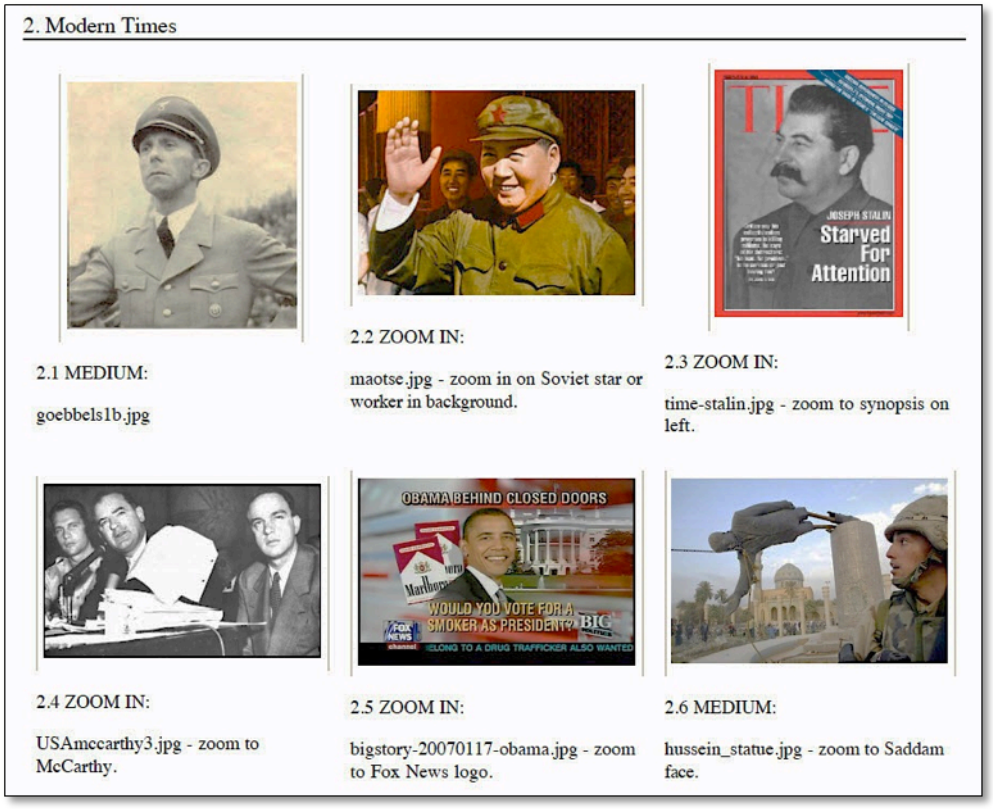

Figure 2. A section of a storyboard created with the program, Celtx

Guideline 6: *Organize all of the digital story materials*

Our experience has taught us that a system for cataloguing all of the digital story materials will help students stay organized and easily able to locate all of the important files they will be using in their digital story project. We have seen far too many cases where students have stored files stored in numerous locations, only to become frustrated and discouraged when these files cannot be found. Here are a several important organizational strategies for beginning digital storytellers.

1. Before any other work is done on the computer, students should begin by creating a folder on the computer's desktop where all of the files related to the digital story can be stored.
2. Inside this master folder, separate sub-folders should be created for the script, storyboard, text files, images, audio narration, music, video clips, and any other materials that will be used.
3. If you a PC running the Windows operating system is being used, students should verify that the file extensions of a file are viewable and if not, the settings on the computer should be adjusted to make sure that file extensions are displayed and not hidden.
4. After collecting and creating a large number images that could be used in their digital story, students are encouraged to go to the master image folder and make copies of just the images they select to go into the story and place them in a new folder, named something like "Photos-to-Use." Since these selected images will often be inserted into a storyboard in the order in which they will be shown in the final digital story, we also suggest that these images be renamed with numbers that indicate the order in which they will be displayed in the story, such as image-01.jpg, image-02.jpg, etc. Then when they are inserted into the digital storytelling software program used to create the story, they will appear in the correct order. New images can always be added later, and these new images can be re-named something like image-01b.jpg, image-01c.jpg, image-01d.jpg and so forth, so that the correct sequence will be maintained.

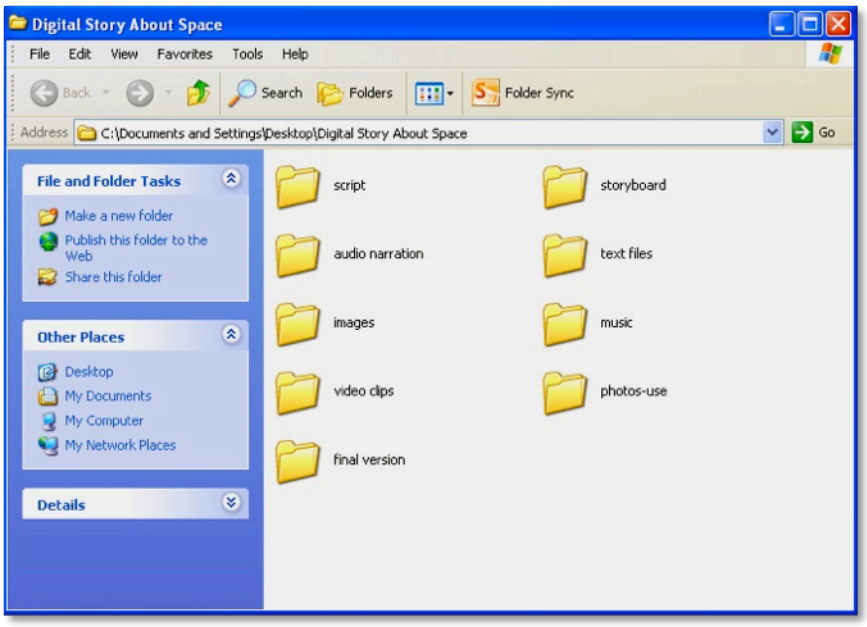

Figure 3: Screen shot of the organization of a folder for a digital story

This type of organization will make locating files much easier and will help students eliminate the frustration and confusion they invariably feel when they cannot locate important pieces of their projects. Storing all files in a master folder also has the added of benefit of allowing the entire

project to be easily copied to a thumb drive or external hard drive so that the student may work on the digital story project on a different computer.

Guideline 7: ***Use visually interesting images that support and strengthen the story***

While they are writing the script, creators of digital stories should think about what kinds of images they will use to add meaning and interest. Students generally search for online images early in the design process, but they often select low quality, low-resolution images that appear first in their search query. A low-resolution image can often ruin a digital story because of the blurry quality and difficulty in viewing the details in an image. Often students do not realize that they can limit their search to high-resolution, large-size images in the search engine.

Many students who ask for advice about how to find high quality images for their stories do not appreciate that the choice of topic plays a large role in this process. For example, if a student chooses a topic about space exploration, there is an abundance of high quality images courtesy of NASA (http://www.nasa.gov). However, if a student chooses the history of World War I as the topic of their digital story, there is a significantly smaller selection of high quality photographs available on this subject.

Guideline 8: ***Be inventive in creating useful images***

In addition to finding and downloading images from the web for use in their digital stories, digital story creators should also be encouraged to take their own pictures with a digital camera, scan images from books, newspapers or magazines, create charts and graphs with spreadsheet software, or even use graphic layouts created in Microsoft PowerPoint and saved as still images for use in a digital story.

In our work, we have found that many students are not aware that PowerPoint slides may be saved as separate image files instead of the more customary method that is used to save slides in the .PPT or .PPTX format for presentation as a slide show. Using PowerPoint's File Save As option, this method may be used to save one or more slides in common digital image file format, such as .GIF, .JPG, .PNG, or .BMP. These image files may then easily be inserted into a digital story in the same manner as any other graphic.

Guideline 9: ***Use the highest quality images available***

When searching for images on the web, digital story creators should always try to find large, high-resolution images. When using an image search engine, restrict the image search to only large, high-resolution images if possible. Be sure that the full size image is saved, and not just the thumbnail image.

When high-resolution images are not available and a lower quality image must be used, we recommend that panning and zooming for that image not be used. When a low quality image must be used, and several are available, students should consider creating a photo collage of these multiple images, and saving the group as a single high-resolution image. There are several easy to use software applications that can be used to create photo collages, including Picasa, Microsoft AutoCollage and even PowerPoint. We have a page on our [1]Educational Uses of Digital Storytelling website devoted to creating photo collages for digital stories.

Guideline 10: ***Address issues of copyright and fair use***

Issues of ownership, copyright, permission, and educational fair use invariably come up in any discussion involving the use of digital content created by someone else. The use of copyrighted material is indeed a serious concern and one that many educators and policy makers study and discuss. Unfortunately, there is not yet a definitive answer to the question of what materials may or may not be freely used in educational projects. Some educators feel that if a picture or a video clip may be easily found and downloaded from the web, then it is permissible to use this material in an educational digital story. But other educators have a different opinion and do not want their students to use any materials that were created by someone else. As mentioned, we encourage our students to use digital cameras and camcorders to shoot their own pictures and video, create their own charts and graphs with software such as Microsoft Excel, search for copy-right-free music

on the web rather than use commercial songs, and in general, think about how to create a digital story that uses as many copyright-free materials as possible.

But our overarching philosophy is that each educator needs to answer the question of copyright and educational fair use themselves, by carefully considering several factors, including the digital medium being used, the nature of that use, the policies in place at their school or institution, and, perhaps most importantly, their own comfort level in using and having students use material that can easily be downloaded from the web or re-mixed with commonly available computer hardware and software. There are many lengthy and often confusing copyright websites that aim to help educators make sense of copyright and educational fair use, and unfortunately, there are no simple or one-size-fits-all answers. For those who wish to explore this topic in more detail, we have included a variety of online resources on these important topics on the [1]Educational Uses of Digital Storytelling website.

IV. Develop

In the develop phase, the designer of the instruction creates the actual instructional product. In this ADDIE phase, digital story creators use digital story software such as Apple iMovie, Microsoft Photo Story 3, Windows Movie Maker, Adobe Photoshop or Premiere Elements to create the story.

Guideline 11: *Use blank slides for titles and fades*

Some software applications that are commonly used to create digital stories, such as Microsoft Windows Live Movie Maker, Adobe Photoshop Elements and Apple iMovie provide the option of creating a blank title screen directly from within the program. However, older software applications, such as Microsoft's Photo Story 3, do not provide this option for inserting a separate blank slide, so Photo Story 3 users need to create a blank slide outside of the program if it is to be added to the digital story.

One of the easiest ways to create a blank slide is to use Microsoft PowerPoint. Using PowerPoint's Format Background command, we recommend using a solid fill white or black background, although a gradient or pattern fill may also be used. Then use the "save as" option under the File menu to save the slide as a graphic file such as a JPEG or PNG. Text can then be added as desired to create a title or even provide information in the digital story. In the example shown in Figure 4, a black slide was created in PowerPoint and exported as a JPG. The graphic was then imported into Photo Story 3, and white text was added.

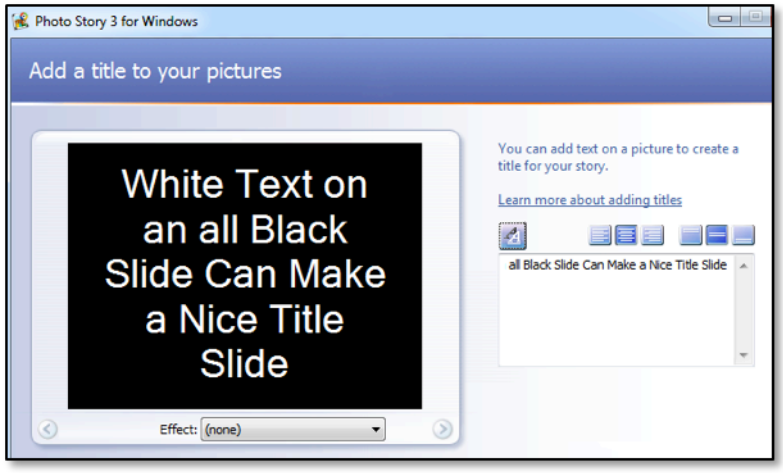

Figure 4: Adding text screen in Microsoft Photo Story 3

In addition, blank slides can also serve as a good way to transition between different sections of a digital story. By setting the timing on a blank slide for just a second or two, a totally black slide can

be used to change topics as one slide fades out to black and the next slide fades in from black. We also encourage the addition of a black slide at the end of the digital story. This ensures that the story not stop abruptly, but will slowly fade to black as the story ends. This adds a more elegant and finished look to the story and demonstrates that care was taken throughout the entire digital story development.

Guideline 12: *Record high quality audio*

Many students find it difficult make a high quality recording of themselves narrating the script of their digital story. This is not surprising since there are many factors involved in creating a high quality sound recording for use in their story. These factors include the specific audio recording software being used, the type of microphone, the quality of the computer's sound card, the recording volume setting on the computer, how loud the student speaks, and the amount of background noise that can be heard during the recording process.

We recommend that digital story creators record their narration with USB microphones and Audacity, a free digital audio recording and editing software program available for Windows and Macintosh computers from: http://audacity.sourceforge.net/download/. When using Audacity, students may choose to save the recorded audio files as either MP3 or WAV files. Since MP3 files will be approximately one-tenth the file size of WAV files, we strongly recommend that when students use Audacity, they export the audio clips as WAV files, which are uncompressed, instead of MP3 files, which are highly compressed. Saving audio files in an uncompressed format becomes even more important when the digital story is saved, because many software programs used to create the final version of the digital story will add its own compression to the file, reducing the audio quality even more.

Guideline 13: *Be thoughtful about the use of additional multimedia elements*

In addition to the customary process of creating digital stories with still images, some students may decide that they want to include external media elements such as multiple pieces of music, audio or video interviews of other people, and portions of video clips downloaded from the web, shot with a camcorder or created with screencasting software. There are many media clips available online, and students will need to think critically about which ones effectively support their story.

A level of technological sophistication is often needed to locate these kinds of multimedia and then reuse or remix them to include in digital story projects. Digital stories that make use of these media resources can often help facilitate classroom learning and inquiry while engaging and motivating students to demonstrate their knowledge and understanding of important educational content. However, that benefit should be carefully weighed against the amount of time and effort that will be required to integrate these media elements into a digital story project. Even though it is now easier to work with these media clips than it has been in the past, students who choose to work with more varied types of files should be aware that they will face more challenges than those students who attempt to design and develop more simple digital stories that primarily make use of still images and audio narration.

Guideline 14: *Use meaningful file names for images and other media*

When downloading media from the web for use in a digital story, the file names should be re-written using descriptive information without any spaces in the file names. The original image may have a nonsense label that will be meaningless later, and may even cause problems when inserted into some software applications. In the new file name, hyphens and underscores should be used instead of spaces. For example, the following image of the rings of Saturn was downloaded from the NASA website with this actual file name: 216200main_pia10246-516.jpg

Figure 5. An image found online with an unintuitive file name

Renaming this file so that it more accurately describes what the picture shows, such as Saturn-rings.jpg, would be a much better choice.

Guideline 15: *Edit a copy of the file, rather than the original file*

When working with audio and video clips, students should be instructed to make a copy of the original file before they do any editing, and conduct the editing using this copy. That way, no matter what changes are made during the editing, the original file will still be available and can be opened again should anything go wrong during the editing process. Students who edit original audio or video files often change their mind after the editing is done and want the original file back.

Guideline 16: *Save files early and often–and in more than one location*

As students work on their digital stories, they should save multiple versions as well as both project file and the completed story files. We encourage students to save the project file and keep a copy in a safe place. In almost every digital storytelling workshop, there is at least one participant who forgets to do this and then loses all of their work. So a guiding principle for digital storytellers is to save the project file often, especially after making significant changes to the story. We encourage students to save the project file with a new version number in the file name every so often, as major new pieces of the story are added.

When saving a digital story file, students should also try to use descriptive names and again, no spaces. For example, the file name, *Martin-Solution-to-Pollution-2012.wp3,* includes the name of the storyteller plus the topic and year that the story was produced. When the final output file is saved, we recommend that the project file be saved one more time first and then the final output file be saved in a separate folder where just the final version of the completed story will go. Separating the locations where the project file and final output files are stored can often prevent the two files from being mixed up or even accidentally deleted. As another layer of protection, we also suggest that students save copies of their project files and final output files on a thumb drive, external hard drive or external website such as Dropbox, www.dropbox.com/.

Guideline 17: *Save the final version of the digital story in different formats*

In today's multimedia universe, a digital story can be saved in a number of different file formats. Students should save the final version in more than one format, such as WMV, MOV, and MP4, so that they have the most flexibility when they are ready to share the story with the world. This way at least one version of the final digital story may be included on a website, posted to a blog, inserted into a PowerPoint presentation, or easily added to other programs and applications.

V. Implement

In the implement phase, the designer of the instruction plans for the implementation of the product in the actual learning context. In this ADDIE phase, digital story creators plan how to use the story and may use programs such as Microsoft Word to create additional resources including lesson plans, handouts, and other learning supports.

Guideline 18: *Develop educational materials to supplement the digital story*

We encourage students in our courses and participants in our workshops to think about a digital story not as a single educational resource that others will view once or twice, but as a key component in a set of educational resources that can be used by people who view the story and then want to learn more about the topic. In some cases, these might include customary educational materials such as classroom activity sheets, a glossary of terms, and so on. In other cases, the resources may be a collection of PDF files, journal articles, and links to external websites, blogs or podcasts. The important concept to remember is that educational digital stories can be an excellent way to motivate viewers to seek new information and more in-depth instructional content. Since the digital story may be just the first of many other resources that viewers will encounter in order to add depth, complexity, and richness to the learning experience, students are encouraged to locate suitable support materials as well as develop their own as part of a set of educational resources.

VI. Evaluate

In the evaluate phase, the designer of the instruction assesses whether the product was successful in achieving the desired learning goal. In this ADDIE phase, digital story creators use a variety of measures to determine if the learners achieved the goal for the digital story project and revise the story and supplemental materials based on this input. Evaluation is also an important part of all of the four previous phases since revision is also built into each stage.

Guideline 19: *Learn to provide useful and supportive feedback to others' scripts in the design phase and drafts in the develop phase*

There are many opportunities for students to be involved in evaluation of their story as well as the stories of their peers throughout the entire process, from analysis through development.

Joe Lambert (2010) at the Center for Digital Storytelling, and many others who work with digital storytelling, endorse the use of Story Circles, where small groups of digital storytellers share aloud the rough drafts of their scripts in order to get peer feedback about their initial efforts at writing down their ideas. Students who participate in story circles should remember that they are serving a valuable service to their fellow students when they ask questions about the scripts and provide feedback that includes suggestions for how the script might be improved. A potential problem often occurs since most students want to be nice and not cause any problems by suggesting that a script has problems. But realistically, how helpful is feedback like this example below?

"I really liked your script and think you did a great job." Or, "You have selected a very interesting topic and I can't wait to see how your story turns out."

The truth is that this kind of feedback does not really help the student who wants to improve their script. It would be much more useful for a student to receive feedback like the comments in these examples:

"I think your script is well written, but I did not understand the second sentence where you discussed [your topic]. Perhaps if you provided a definition of the term you used, viewers would have a better idea of the point you are trying to make."

"Maybe it's because I'm a former high school language teacher, but I found it distracting that you went back in forth from past tense to present tense in your writing. I think it would be better for you to choose one tense or the other, and stick to that. Using both tenses mixed together does not work for me, and I suspect that others may find this distracting also."

"I like the topic you selected but your script sounds a little too personal. I know that we were told that we should add our own opinions to our scripts, but when I read your story, I felt like I was eavesdropping and learning too many details about your private life. I think it would be better for you to try to think more globally about your topic and write the script in a way that will connect with the viewer, without making the story just about yourself. Also, perhaps you could add something humorous at the end. Laughter, especially when we direct it at ourselves, can be a good way to put people at ease when they deal with serious topics such as this."

These example comments demonstrate how students can provide useful yet supportive feedback to others. Students need to remember that if they don't understand something that's in a script, they should politely ask the writer to explain it better. If they have a question or concern about the script, then it's almost certain that other viewers will too. Time spent on revising and improving the script is always well spent.

Like *Story Circles* used during the design process, *Story Screenings* allow students to share their digital story while it is still being developed. Stories can be shared in the same or different groups that were used in Story Circles. Peer questions should focus on the combination of the script with the media used – video, audio, background music, and images – and how these elements contribute to the goal and tone of the digital story. Students may even make small changes in the product as the screening is occurring; for example, they may decrease the background music or change the pan and zoom effect on an image, then replay the story from that point.

Guideline 20: *Involve students in evaluation throughout the entire process.*

Rubrics are the most common form of assessment for digital stories. A rubric usually includes scales that provide descriptions of different levels of achievement or an understanding for a set of criteria of quality for a given type of performance such as an essay or presentation (Allen & Tanner, 2006). However, it is distinguished from ordinary scoring checklists by its more extensive definition and description of the criteria of quality that characterize each level of accomplishment. When a rubric is given to students prior to a project, it becomes an excellent way to convey expectations. A rubric can be used during the process as a peer evaluation tool. After the project, a rubric gives the teacher a consistent and specific tool to measure many different facets of the digital storytelling process from the script to the audio quality. Students with digital storytelling experience can also be involved in the rubric development and contribute to the categories as well as the criteria.

Many educators, such as Barrett (2006), Ohler (2008), and Teehan (2007-08), have developed rubrics that educators can use to assess digital stories created by students. These rubrics include categories related to the overall quality of the story such as "How well did the story work?" (Ohler, 2008), categories related to image quality such as "Did the images create an atmosphere or tone?" (Teehan, 2007-08) and categories related to audio quality such "Is the voice quality clear and consistently audible throughout the presentation?" (Barrett, 2006).

VII. Conclusion

In this article, we have examined many of the critical components faced by students and participants in our digital storytelling courses and workshops. Based on this work with large numbers of new digital story creators, we have provided a set of specific recommendations and guidelines based on the lessons we have learned. We feel that these recommendations provide useful guidance for educators who would like to begin teaching digital storytelling to their own students, either in formal classroom settings or more informal workshops. The guidelines are

categorized within the ADDIE instructional design framework and are presented as starting points that educators should consider when they begin to integrate digital storytelling in their classrooms.

These lessons include a strong focus on preparation and organization before the physical creation process begins and stresses the importance of key components of the digital storytelling process, including selecting a meaningful topic, developing a well-crafted script, working with high quality media files and including students in an ongoing evaluation process. In actuality, our experience has taught us that every aspect of the digital storytelling process, from the initial design through the final development, are all important and each one has the potential to enhance or detract from the final digital storytelling project that a student creates. It is our hope that educators who undertake the task of teaching digital storytelling will benefit from our mistakes and our acquired knowledge in using this technology to improve their teaching and ultimately, improve their students' learning.

The Educational Uses of Digital Storytelling Website is online at:
http://digitalstorytelling.coe.uh.edu/

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